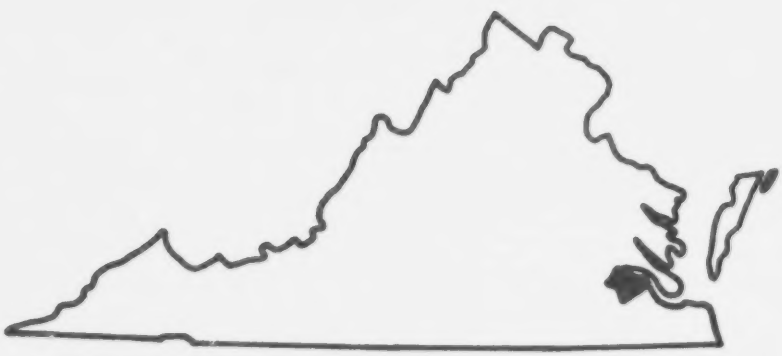
FEMA.209:

OCT 16 1990

FLOOD INSURANCE STUDY

SURRY COUNTY, VIRGINIA AND INCORPORATED AREAS



COMMUNITY NAME	COMMUNITY NUMBER
CLAREMONT, TOWN OF	510158
DENDRON, TOWN OF	510300
UNINCORPORATED AREAS	510157

NOVEMBER 2, 1990

Federal Emergency Management Agency

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision (LOMR) process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial Countywide Flood Insurance Study Effective Date: November 2, 1990

Flood Insurance Study Revised:

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FLOOD INSURANCE STUDY
SURRY COUNTY AND INCORPORATED AREAS, VIRGINIA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in, and revises and updates previous Flood Insurance Studies/Flood Insurance Rate Maps for, the geographic area of Surry County, Virginia, including: the unincorporated areas of Surry County, and the Towns of Claremont and Dendron (hereinafter referred to collectively as Surry County). The Town of Surry, which is located within Surry County, is non-flood-prone. The information in this study aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates, assist the community in its efforts to promote sound floodplain management, and update existing floodplain regulations as part of the Regular Program of the National Flood Insurance Program. Minimum floodplain management requirements for participation in the NFIP are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were prepared by the Norfolk District of the U. S. Army Corps of Engineers (COE) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-87-E-2509, Project Order No. 3, Amendment No. 1. This work was completed in July 1988.

1.3 Coordination

On June 16, 1986, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives of FEMA, the county, and the COE (the study contractor) to determine the streams to be studied by detailed methods.

Contacts with various Federal and State agencies were made during the preparation of the study in order to minimize possible hydrologic and hydraulic conflicts. A search for basic data was made at all levels of government.

On September 19, 1989, a final CCO meeting was held with representatives of FEMA, the county, and the study contractor to review the results of the study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the geographic area of Surry County, Virginia. The area of study is shown on the Vicinity Map (Figure 1).

Tidal flooding from the James River and its adjoining estuaries was studied by detailed methods. All areas within the county affected by tidal flooding were included in the detailed study. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through July 1993.

All or portions of the following flooding sources were studied by approximate methods: Upper Chippokes Creek, Bailey Branch, Spring Grove Swamp, the Blackwater River, Otterdam Swamp, Reedy Branch, Johnchecohunk Swamp, Averys Pond, Cypress Swamp, Mill Swamp, Golden Hill Branch, Moores Swamp, Green Swamp, Dark Swamp, Cypress Run, Pooles Creek, Terrapin Swamp, Milltail Creek, Lumber Run, Lawnes Creek, and Passenger Swamp. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and Surry County.

2.2 Community Description

Surry County is located in southeastern Virginia. The county is bordered by the unincorporated areas of Isle of Wight County and Southampton County to the east, the unincorporated areas of Sussex County to the south, and the unincorporated areas of Prince George County to the west. The following flooding sources also border the county: the James River to the north, the Blackwater River to the south, and Upper Chippokes Creek to the west. Surry County encompasses an area of approximately 280 square miles, of which 26 square miles are water (Reference 1).

The population of Surry County was 6,046 in 1980 (Reference 2). Agriculture and the production of pulpwood and lumber are the principal industries in the county. The sandy loam soil is well-adapted to general crops. In particular, Surry County is known for its peanuts. Soybeans and corn are also raised in large quantities. The floodplains of the county consist of scattered residential structures, businesses, croplands, and forests. With the county's many miles of shoreline, increased pressure for development of the floodplains is expected. In the extreme northeastern corner of the county is Hog Island Waterfowl Refuge, a 2,485-acre tract on the James River, set aside as a winter home for Canadian Geese and other migratory fowl. The Surry Nuclear Plant, constructed by Virginia Power, is also located at Hog Island.

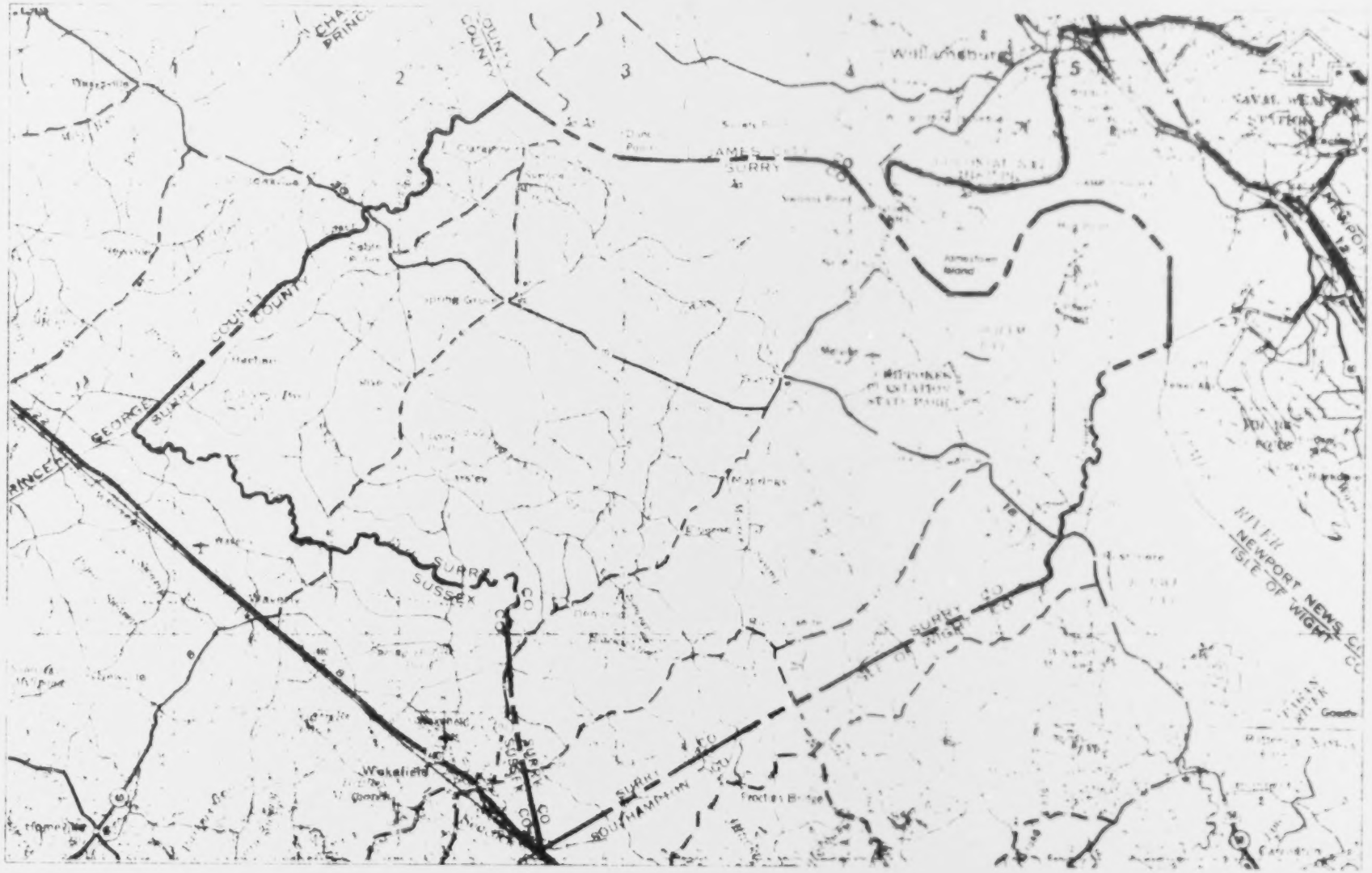

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

SURRY COUNTY, VA
AND INCORPORATED AREAS

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

Surry County enjoys a temperate climate, with moderate seasonal changes characterized by warm summers and cool winters. Temperatures average approximately 78 degrees Fahrenheit (^{o}F) in July, the warmest month; and 41^{o}F in January, the coolest month. Annual precipitation over the area averages approximately 43 inches per year (Reference 1). There is some variation in the monthly averages; however, this rainfall is distributed uniformly throughout the year. Snowfall is infrequent, generally occurring in light amounts and usually melting in a short period of time.

Surry County is located in the Coastal Plain province and is underlain primarily by sand, gravel, clay, and marl strata. Elevations within the county range from sea level to approximately 130 feet.

2.3 Principal Flood Problems

The areas along the shoreline of Surry County are vulnerable to tidal flooding from major storms, commonly referred to as hurricanes and northeasters. Both storms produce winds that push large volumes of water against the shore.

Hurricanes, with their high winds and heavy rainfall, are the most severe storms to which the county is subjected. The term "hurricane" is applied to an intense cyclonic storm originating in tropical or subtropical latitudes in the Atlantic Ocean just north of the equator. While hurricanes may affect the area from May through November, nearly 80 percent occur during the months of August, September, and October with approximately 40 percent occurring during September. The most severe hurricane to strike the county occurred in August 1933.

Another type of storm that can cause severe damage to the county is the northeaster. This is also a cyclonic storm, and originates with little or no warning along the middle and northern Atlantic Coast. These storms occur most frequently in the winter months but may occur at any time. Accompanying winds are not of hurricane force, but are persistent, causing above-normal tides for long periods of time. The March 1962 northeaster was the most severe to ever hit the county.

The amount and extent of damage caused by any tidal flood will depend upon the topography of the area flooded, rate of rise in floodwaters, depth and duration of flooding, exposure to wave action, and the extent to which damageable property has been placed in the floodplain. The depth of flooding during these storms depends upon the velocity, direction, and duration of the wind; the size and depth of the body of water over which the wind is acting; and the astronomical tide. The duration of flooding depends upon the duration of the tide-producing forces. Floods caused by a hurricane are usually of a much shorter duration than the ones

caused by a northeaster. Flooding from hurricanes rarely lasts more than one tidal cycle; however, flooding caused by northeasters may last several days, during which the most severe flooding takes place at the time of the peak astronomical tide.

The timing or coincidence of the maximum storm surge with the normal high tide is an important factor in the consideration of flooding from tidal sources. The mean range of tide in the James River at Hog Point is one foot. The range of tide may be somewhat less in the connecting bays and inlets (Reference 3).

The area also contains estuaries of the James River that are subject to tidal flooding in their lower reaches but fluvial flooding on the upper reaches. Flooding on the upper reaches of these streams, on tributaries of the Blackwater River, and other streams in Surry County may be caused by heavy rains occurring at any time during the year. Flooding may also occur as a result of intense rainfall produced by local thunderstorms or tropical disturbances such as hurricanes, which move into the area from the Gulf or Atlantic coasts. The effects of riverine flooding are not addressed in this study.

Surry County has experienced major storms since the early settlement of the area. Historical accounts of severe storms in the area date back several hundred years. The following paragraphs discuss some of the large storms that have occurred in recent history.

The hurricane of August 23, 1933 was one of the most severe storms that ever occurred in the Middle Atlantic region. This tropical hurricane passed inland near Cape Hatteras on August 22, passed slightly west of Norfolk, and continued towards the north accompanied by extreme high wind and tide. The storm surge in the Chesapeake Bay and tidal estuaries was the highest of record and coincided with astronomical high tide. The water level reached a maximum of 3 feet in Hampton Roads (Reference 4).

Hurricane "Hazel," the second most destructive of recent hurricanes to strike the area, entered the mainland south of Wilmington, North Carolina, during the morning of October 15, 1954, and moved rapidly northward, passing over Norfolk and Fredericksburg in the early afternoon. The winds were from the east and southeast until the eye passed. When the eye passed, the winds shifted to the southwest with higher velocities. The hurricane surge was not as high as the August 1933 storm, although the tidal surge was superimposed on the normal high tide. In addition to damage by tidal flooding, much damage was caused to roofs, communication lines, and other structures by the high wind. Damage of this nature is characteristic of that to be expected during hurricanes (Reference 4).

The most recent flood of major proportions in the area occurred during the northeaster of March 6-8, 1962. Disastrous flooding and high waves occurred along the Atlantic seaboard from New York to Florida. This flood was unusual, even for a northeaster, since it was caused by a low pressure cell that moved from south to north past Hampton Roads and then reversed its course, moving again to the south and bringing with it huge volumes of water and high waves. The maximum flood height occurred on the morning of March 7 and reached 7.4 feet in Hampton Roads (Reference 5).

2.4 Flood Protection Measures

There are no existing flood control structures that would provide protection during major floods in Surry County. There are several measures that have provided some protection against flooding. These include bulkheads, seawalls, jetties, and nonstructural measures for floodplain management, such as zoning codes. The "Uniform Statewide Building Code," which went into effect in September 1973, states, "where a structure is located in a 100-year flood plain, the lowest floor of all future construction or substantial improvement to an existing structure...must be built at or above that level, except for nonresidential structures which may be floodproofed to that level" (Reference 6).

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the county, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic and Hydraulic Analyses

Analyses were carried out to establish the peak elevation-frequency relationships for each flooding source studied in detail affecting the county.

Tidal flood-frequency elevations used in this study for the James River were taken from the Flood Insurance Study for the City of Norfolk (Reference 7).

The stillwater elevations for the 10-, 50-, 100-, and 500-year floods have been determined for the James River and are summarized in Table 1, "Summary of Stillwater Elevations."

TABLE 1 - SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION (feet)			
	10-YEAR	50-YEAR	100-YEAR	500-YEAR
JAMES RIVER AND ESTUARIES				
Entire shoreline within community	6.4	7.8	8.5	9.8

Hydraulic analyses, considering storm characteristics and the shoreline and bathymetric characteristics of the flooding sources studied, were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of the shorelines.

Special consideration was given to the vulnerability of Surry County to wave attack along shorelines of the James River during severe hurricanes and northeasters. Areas of shoreline subjected to significant wave attack are referred to as coastal high hazard zones. Methods have been developed to determine which sections of a shoreline fall into this category (Reference 8). The factors considered for such a determination include: choice of a suitable fetch, its length and width, sustained wind velocities, coastal water depths, and physical features of the shoreline that would appreciably affect wave propagation. All of these factors are analyzed to determine if a wave with a height of 3 feet could be generated. The 3-foot wave has been determined to be the minimum size wave capable of causing major damage to conventional wood-frame or brick veneer structures. This criterion has been adopted by FEMA for the determination of V zones.

Based on the above criteria, the shoreline of Surry County is not exposed to severe wave attack and has not been designated as part of a coastal high hazard zone.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the Flood Insurance Rate Map (Exhibit 1); the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 2).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries to assist in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the flooding sources studied in detail, the 100- and 500-year floodplain boundaries have been delineated using topographic maps at a scale of 1:24,000 with contour intervals of 5 and 10 feet (Reference 9).

For the flooding sources studied by approximate methods, the 100-year floodplain boundaries were delineated using the Flood Hazard Boundary Map for the unincorporated areas of Surry County and the Flood Insurance Study for the Town of Dendron (References 10 and 11).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 1). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE), and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the flooding sources studied by approximate methods, only the 100-year floodplain boundary is shown on the Flood Insurance Rate Map (Exhibit 1).

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

The current Flood Insurance Rate Map represents flooding information for the entire geographic area of Surry County. Previously, separate Flood Hazard Boundary Maps and/or Flood Insurance Rate Maps were prepared for each identified flood-prone incorporated community and the unincorporated areas of the county. Historical data relating to the maps prepared for each community are presented in Table 2, "Community Map History."

7.0 OTHER STUDIES

Flood Insurance Studies have been prepared for the unincorporated areas of Sussex and Prince George Counties (Refererces 12 and 13). The results of this study are in general agreement with the results of those studies.

A Flood Insurance Study has been prepared for the unincorporated areas of Southampton County (Reference 14). Because of the differences in methodologies used to delineate approximate floodplain boundaries, the results of this study are not in exact agreement with the results of that study.

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Claremont, Town of	April 4, 1975	None	November 2, 1990	
Dendron, Town of	November 15, 1974	June 4, 1976	July 16, 1982	November 2, 1990
Surry County, Unincorporated Areas	December 6, 1974	February 5, 1982	November 2, 1990	

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

SURRY COUNTY, VA AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

A Flood Insurance Study has been prepared for the unincorporated areas of Charles City County (Reference 15). The results of this study are in exact agreement with the results of that study.

Flood Insurance Studies are currently being prepared for the unincorporated areas of James City and Isle of Wight Counties (References 16 and 17). The results of those studies will be in exact agreement with the results of this study.

Because it is based on more detailed and up-to-date analyses, this study supersedes the Flood Hazard Boundary Map for the unincorporated areas of Surry County and the previously printed Flood Insurance Study for the Town of Dendron (References 10 and 11).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, Liberty Square Building (Second Floor), 105 South Seventh Street, Philadelphia, Pennsylvania 19106.

9.0 BIBLIOGRAPHY AND REFERENCES

1. Commonwealth of Virginia, Division of State Planning and Community Affairs, Data Summary-Surry County, Richmond, Virginia, April 1970.

2. U. S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Number of Inhabitants, Virginia, Washington, D. C., U. S. Government Printing Office, 1981.

3. U. S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Tide Tables 1988, High and Low Water Predictions, East Coast of North and South America Including Greenland, Washington, D. C., 1987.

4. U. S. Army Corps of Engineers, House Document 354, 87th Congress, 2nd Session, Norfolk, Virginia-Interim Hurricane Survey, 1962.

5. U. S. Army Corps of Engineers, Norfolk District, March 1962 Storm on the Coast of Virginia, Norfolk, Virginia, August 10, 1962.

6. Commonwealth of Virginia, Virginia Uniform Statewide Building Code, Article 8, Part C, Section 872.6, September 1973.

7. Federal Emergency Management Agency, Flood Insurance Study, City of Norfolk, Independent City, Virginia, Washington, D. C., April 17, 1984.

8. U. S. Army Corps of Engineers, Galveston District, General Guidelines for Identifying Coastal High Hazard Zones, Galveston, Texas, 1975.

9. U. S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Intervals 5 and 10 Feet: Disputanta North, Virginia, 1965, Photorevised 1974; Savedge, Virginia, 1966, Photorevised 1974; Claremont, Virginia, 1966; Surry, Virginia, 1965, Photorevised 1979; Hog Island, Virginia, 1965, Photorevised 1979; Disputanta South, Virginia 1968, Photorevised 1981; Waverly, Virginia, 1969, Photorevised 1980; Dendron, Virginia, 1969, Photorevised 1979; Runnymeade, Virginia, 1968, Photorevised 1973; Bacons Castle, Virginia, 1969; Ivor, Virginia, 1968, Photorevised 1979; and Raynor, Virginia, 1968.

10. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Unincorporated Areas of Surry County, Virginia, February 5, 1982.

11. Federal Emergency Management Agency, Flood Insurance Study, Town of Dendron, Surry County, Virginia, Washington, D. C., July 16, 1982.

12. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Sussex County, Virginia, Washington, D. C., March 2, 1983.

13. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Unincorporated Areas of Prince George County, Virginia, Washington, D. C., May 1, 1980.

14. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Southampton County, Virginia, Washington, D. C., December 15, 1982.

15. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Charles City County, Virginia, Washington, D. C., September 5, 1990.

16. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of James City County, Virginia (Unpublished).

17. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Isle of Wight County, Virginia (Unpublished).

EXHIBIT 2 - ELEVATION REFERENCE MARKS

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 1	15	11.47	National Geodetic Survey disk, stamped K 279 1942, set in southeast corner of southwest curb of concrete bridge along State Route 10 approximately 0.8 mile northwest of junction of State Route 10 and State Route 613 at Cabin Point.
RM 2	20	3.960	NGS disk, stamped A 453 1971, set on top of copper-coated steel rod flush with ground and encased in 4-inch metal pipe projecting 2 inches from ground, along south bank of the James River near junction of Mancha Avenue and County Route 1220 leading northeast to dead end at shoreline; disk is approximately 67 feet southeast of east corner of concrete-block house, approximately 47 feet northwest of County Route 1220 centerline, and approximately 1.5 feet northwest of metal witness post.
RM 3	20	11.571	NGS disk, stamped A 278 1942, set vertically in north face of brick column for vacant, former post office building located on southwest corner of junction of Mancha Avenue and Bailey Avenue; disk is approximately 11 feet east of center of entrance to building, approximately 27.6 feet west of northeast corner of building, and approximately 2.2 feet above level of concrete sidewalk.
RM 4	20	110.731	NGS disk, stamped Z 453 1971, set on top of copper-coated steel rod flush with ground and encased in 4-inch metal pipe projecting 1 inch from ground; disk is located near junction of State Route 646 (Spring Grove Avenue) and State Route 613 (Cabin Point Road), approximately 201 feet southwest of center of junction, approximately 25 feet west of centerline of State Route 646, and approximately 2.5 feet north of power pole No. 9193.

EXHIBIT 3 - ELEVATION RFFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 5	20	87.71	National Geodetic Survey disk, stamped D 298 1946, set in top of concrete post projecting three inches above ground, approximately 2.2 miles northwest along State Route 626 from junction of State Route 610; approximately 18 feet north of centerline of State Route 626, and approximately two feet northwest of metal witness post.
RM 6	20	82.52	National Geodetic Survey disk, stamped C 298 1946, set in top of concrete post projecting three inches above ground, approximately 1.3 miles northwest along State Route 626 from junction of State Route 610, approximately 50 feet northeast of gate, approximately 49 feet northeast of cedar tree, and approximately 19 feet northeast of centerline of State Route 626.
RM 7	40	107.53	National Geodetic Survey disk, stamped B 298 1946, set in top of concrete post projecting two inches above ground, approximately three miles west along State Route 610 from junction of State Route 618, approximately 18 feet north of centerline of State Route 610, approximately three feet west of 12-inch oak tree, and approximately two feet west of metal witness post.

EXHIBIT 2 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 8	40	104.57	National Geodetic Survey disk, stamped A 298 1946, set in top of concrete post projecting four inches above ground, approximately two miles west along State Route 610 from junction of State Route 618, approximately 18 feet south of centerline of State Route 610, approximately 13 feet east of centerline of woods road, approximately 15 feet north of 20-inch pine tree, and approximately one foot west of metal witness post.
RM 9	40	103.27	National Geodetic Survey disk, stamped Z 298 1946, set in top of concrete post projecting two inches above ground, approximately 1.1 miles west along State Route 610 from junction of State Route 618, approximately 19 feet north of centerline of State Route 610, approximately 19 feet west of trail leading north, and approximately two feet east of metal witness post.
RM 10	40	99.99	National Geodetic Survey disk, stamped Y 297 1946, set in top of concrete post projecting two inches above ground, at junction of State Routes 610 and 618, approximately 27 feet south of centerline of State Route 610, approximately 25 feet west of centerline of State Route 618, approximately 17 feet north of 24-inch pine tree, and approximately two feet east of metal witness post.
RM 11	45	5.76	National Geodetic Survey disk, stamped FERRY NO 1 1938, set in top of concrete post flush with ground, approximately 4.3 miles northeast along State Route 31 from courthouse in Surry, at Jamestown Ferry, approximately 115 feet south of southeast corner of wharf leading to ferry, approximately 17.5 feet east of centerline of State Route 31.

EXHIBIT 2 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 12	125	72.61	National Geodetic Survey disk, stamped W 297 1946, set in top of concrete post projecting two inches above ground, at north junction of State Routes 618 and 626, approximately 21 feet south of junction and approximately two feet west of metal witness post.
RM 13	110	74.82	National Geodetic Survey disk, stamped V 297 1946, set in top of concrete post projecting three inches above ground, at junction of State Routes 626 and 620, approximately 22 feet south of centerline of State Route 620, approximately 19 feet east of centerline of State Route 626, and approximately two feet west of metal witness post.
RM 14	110	119.60	National Geodetic Survey disk, stamped Y 279 1942, set in top of concrete post flush with ground, approximately one mile southeast along State Route 10 from courthouse in Surry, approximately 0.3 mile west of large steel telephone relay tower painted orange and white, approximately 25 feet south of centerline of State Route 10, and approximately one foot south of metal witness post.
RM 15	110	121.82	National Geodetic Survey disk, stamped O 453 1971, set vertically in northeast face and at north corner of concrete building of American Telephone and Telegraph Company, near junction of State Route 10 and State Route 638, approximately 68.5 feet southwest of centerline of State Route 10, and approximately 3.3 feet above level of ground.
RM 16	110	69.09	National Geodetic Survey disk, stamped R 280 RESET 1950, set in top and in center of southwest concrete headwall of State Route 10 box culvert for College Run; near junction of State Route 632 leading south, approximately 120 feet northwest of centerline of State Route 632, and approximately 17.7 feet southwest of centerline of State Route 10.

EXHIBIT 2 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 17	110	95.77	National Geodetic Survey disk, stamped S 280 1942, set in top of concrete post projecting approximately one inch above ground, at junction of State Route 10 and State Route 635 leading northeast, approximately 69 feet southeast of centerline of State Route 635, approximately 27.5 feet northeast of centerline of State Route 10, approximately 72 feet south of power pole No. FH 28, and approximately 1.5 feet southwest of metal witness post.
RM 18	110	93.69	National Geodetic Survey disk, stamped P 453 1971, set on top of copper-coated rod attached to metal base plate, level with ground, encased in 4-inch metal pipe projecting three inches above ground, at junction of State Route 10 and State Route 633, approximately 173.5 feet north of centerline of State Route 10, and approximately 27.5 feet east of centerline of State Route 633.
RM 19	110	39.52	National Geodetic Survey disk, stamped U 280 RESET 1950, set in top and in center of north concrete headwall of box culvert for Lower Chippokes Creek, under State Route 10 approximately 1.15 miles west of junction of State Route 617 at Bacons Castle, approximately 18 feet north of centerline of State Route 10.
RM 20	130	80.42	National Geodetic Survey disk, stamped BACON 1932, set in top of concrete post projecting one inch above ground, at Bacons Castle, approximately 0.1 mile east along State Route 617 from junction of State Route 10, approximately 51.5 feet south of centerline of State Route 617 and approximately 43 feet northeast of northeast corner of Bacons Castle Baptist Church.

EXHIBIT 2 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 21	140	88.84	National Geodetic Survey disk, stamped V 280 1942, set in top of concrete post projecting two inches above ground, at junction of State Route 10 and State Route 650, approximately 21 feet west of State Route 650, and approximately 26.5 feet southwest of centerline of State Route 10.
RM 22	140	62.84	National Geodetic Survey disk, stamped L 453 1971, set on top and on northwest side of round concrete support base for north leg of northwest one of three power transmission line towers, located along State Route 10 approximately 1.4 miles southeast of junction of State Route 617 at Bacons Castle; disk is approximately 121 feet southwest of centerline of State Route 10.
RM 23	140	24.25	National Geodetic Survey disk, stamped X 280 RESET 1962, set on top and approximately 1.6 feet west of east end of concrete guardrail for 25-foot bridge over Lawnes Creek, along State Route 10, approximately 0.1 mile west of county boundary, and approximately 21 feet south of centerline of State Route 10.